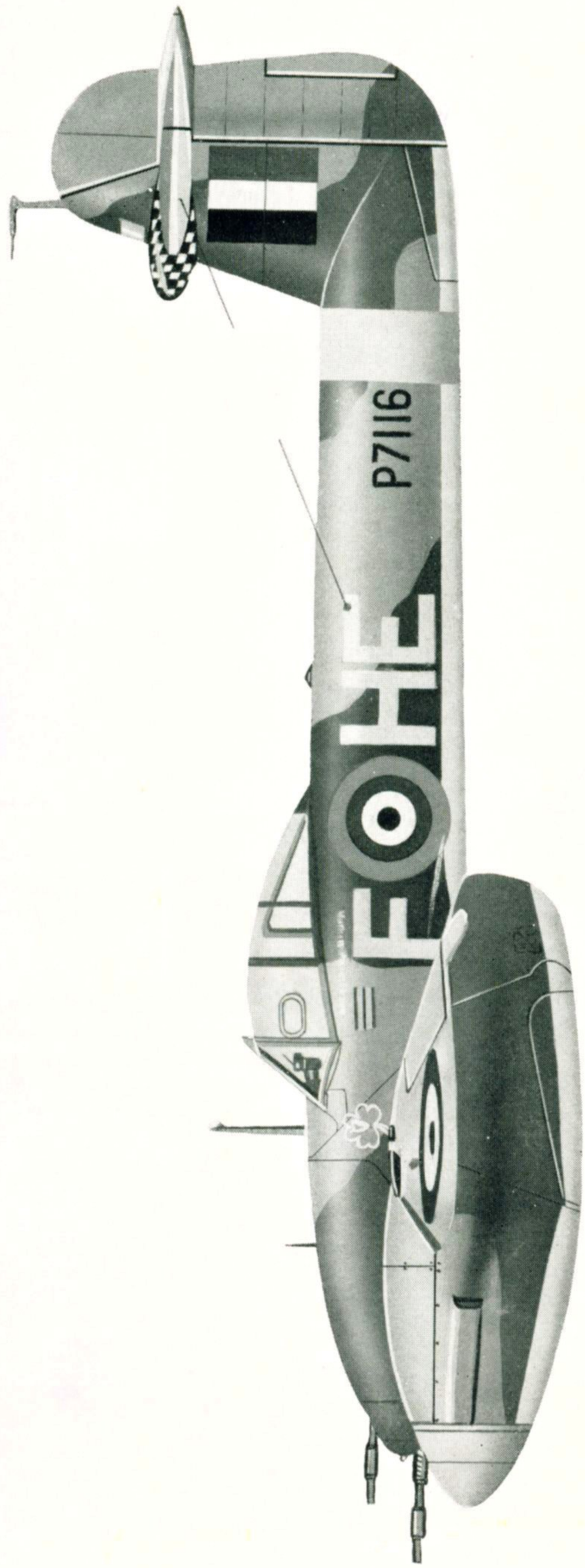
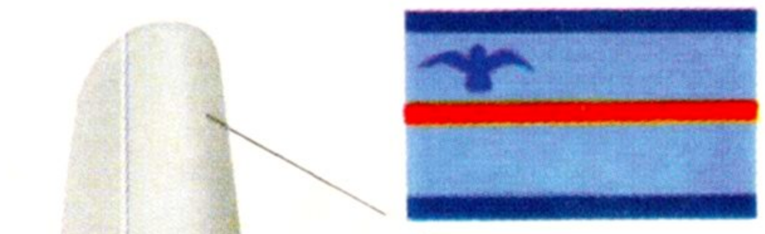
PROFILE PUBLICATIONS

The Westland Whirlwind

NUMBER 191



Sqn. Ldr.'s pennant.



I.F.F. aerials.

Irish harp and shamrock emblem on nose (both sides.)

Presentation inscription beneath cockpit canopy (both sides.)

Camouflage pattern on inside of each cowling identical to outer pattern on same engine.

BELLOWS ARGENTINA Nº2

Westland Whirlwind I, *P7116*, "Bellows Argentina No. 2", flown by the commanding officer of No. 263 (F) Squadron R.A.F.; Colerne, Wiltshire, U.K., January 1942.

© JAMES GOULDING

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The Westland Whirlwind

by Philip J. R. Moyes

Lively action study of Whirlwind P7048 *which served in No. 137 Squadron and later carried the civil registration* G-AGOI.
(Photo: Charles E. Brown)

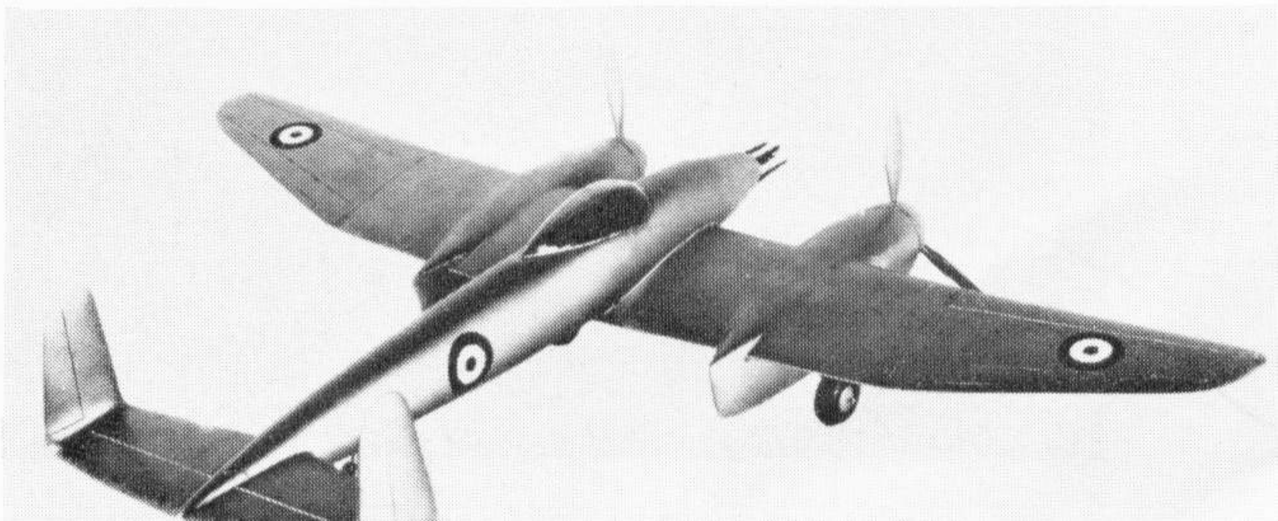
Seldom, if ever, can a British aeroplane have been surrounded by so much "red tape" as was the Westland Whirlwind twin-engined monoplane. Designed to an Air Ministry Specification of 1935 (F.37/35), it flew in October, 1938, and entered service in 1940, being the R.A.F.'s (and Westland's) first twin-engined single-seat fighter and the first such machine to be used in numbers by any of the great powers. For some time after the outbreak of the Second World War its existence was supposed to be a closely-guarded secret, but it was apparently no secret in France and Germany as early as 1938, for in that year drawings of the aircraft appeared in a French technical paper. Lord Beaverbrook, the Minister of Aircraft Production, mentioned the Whirlwind by name in public in December, 1940—the same year in which it appeared in a German aircraft recognition handbook—but it was not officially disclosed by the Air Ministry until August, 1941, and details were not released to the press in this country until February, 1942.

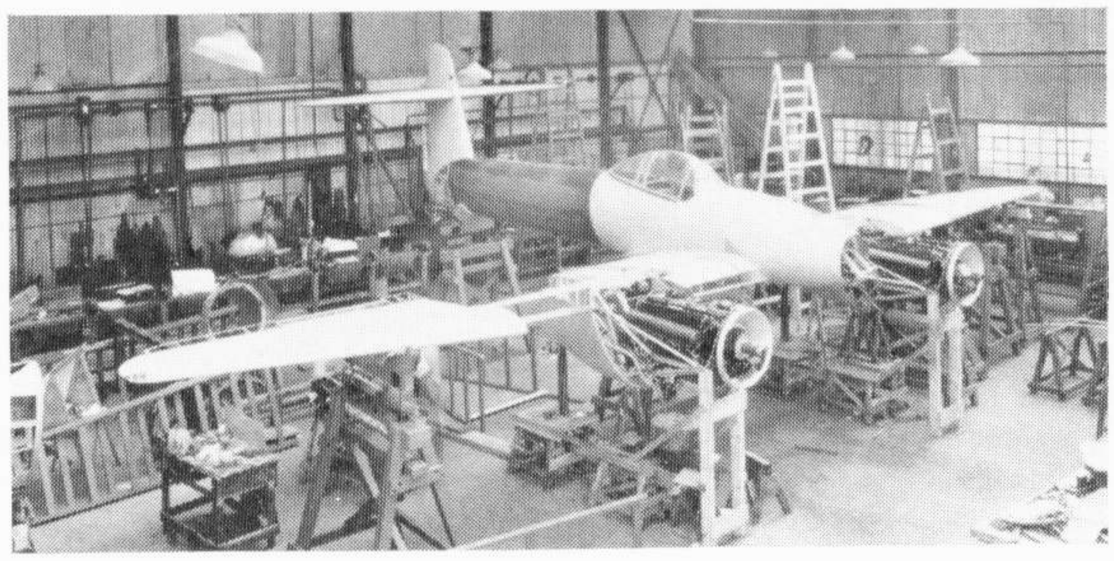
The basic feature of the Whirlwind was its concentration of firepower: its four closely-grouped heavy cannon in the nose had a rate of fire of 600 lb./minute—which, until the introduction of the Beaufighter (see *Profile* No. 137), placed it ahead of any other fighter in the world. Hand in hand with this dense fire-power went a first-rate speed and climb performance, excellent manoeuvrability and a fighting view hitherto unsurpassed. The Whirlwind was, in its day, faster than the Spitfire low down and, with lighter lateral control, was considered to be one of the nicest "twins" ever built.

The Whirlwind was designed by Mr. W. E. W. Petter—more recently of Canberra and Gnat fame—and his team to meet the requirements of Air Ministry Specification F.37/35 for a single-seat day and night fighter. Design work began early in 1936, and although Bristol and Hawker also tendered, the Westland design was the one selected; it had the Westland-type number P.9 (P for Petter, incidentally) and an order for two prototypes was placed by the Air Ministry in February, 1937. The first prototype, *L6844*, first flew at Yeovil on 11th October, 1938, in the hands of Westland's chief test pilot, Harald Penrose. It proved to be faster than anything else, low down, hence its nickname "Crikey", inspired by a famous Shell advertisement of the day which depicted a labourer with a swivel neck seeing something flash past him at a high rate of knots and trying to look in two directions simultaneously, exclaiming: "Crikey, that's Shell, that was!" This nickname was, apparently, first bestowed upon the Whirlwind by a local garage proprietor.

The Whirlwind was designed round two fully-supercharged Rolls-Royce Peregrine twelve-cylinder 'vee'-type engines, the deliberate concentration of fire-power and the desire to give the pilot the best possible view being mainly responsible for its twin-engine configuration. It was completely orthodox in layout and construction (all-metal stressed skin) yet in many ways it was ahead of its time. Leading edge cooling ducts (for radiators which were enclosed in the centre section), thin wing, high tailplane, extruded

Early design study with twin fin and rudder layout.





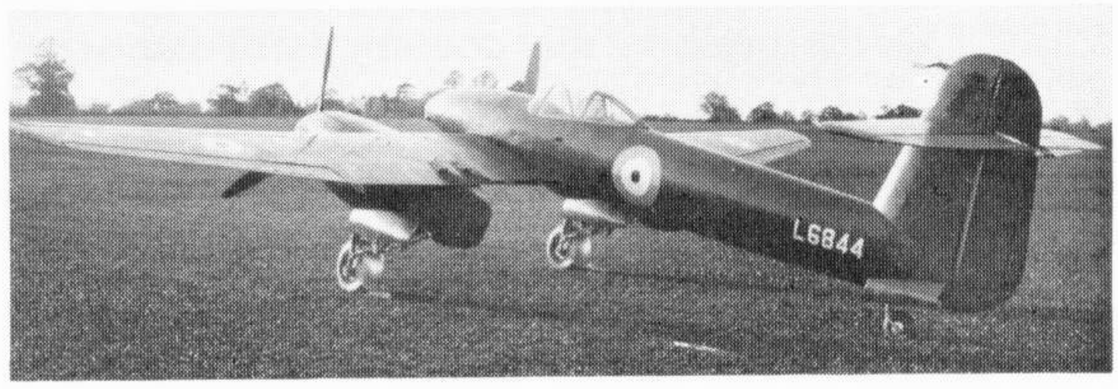
L6844, *first prototype P.9 under construction at Yeovil.*

spars, extensive use of elektron and castings, were typical features with which Westland's design team led the way. The "almost-bubble" one-piece canopy was another excellent innovation.

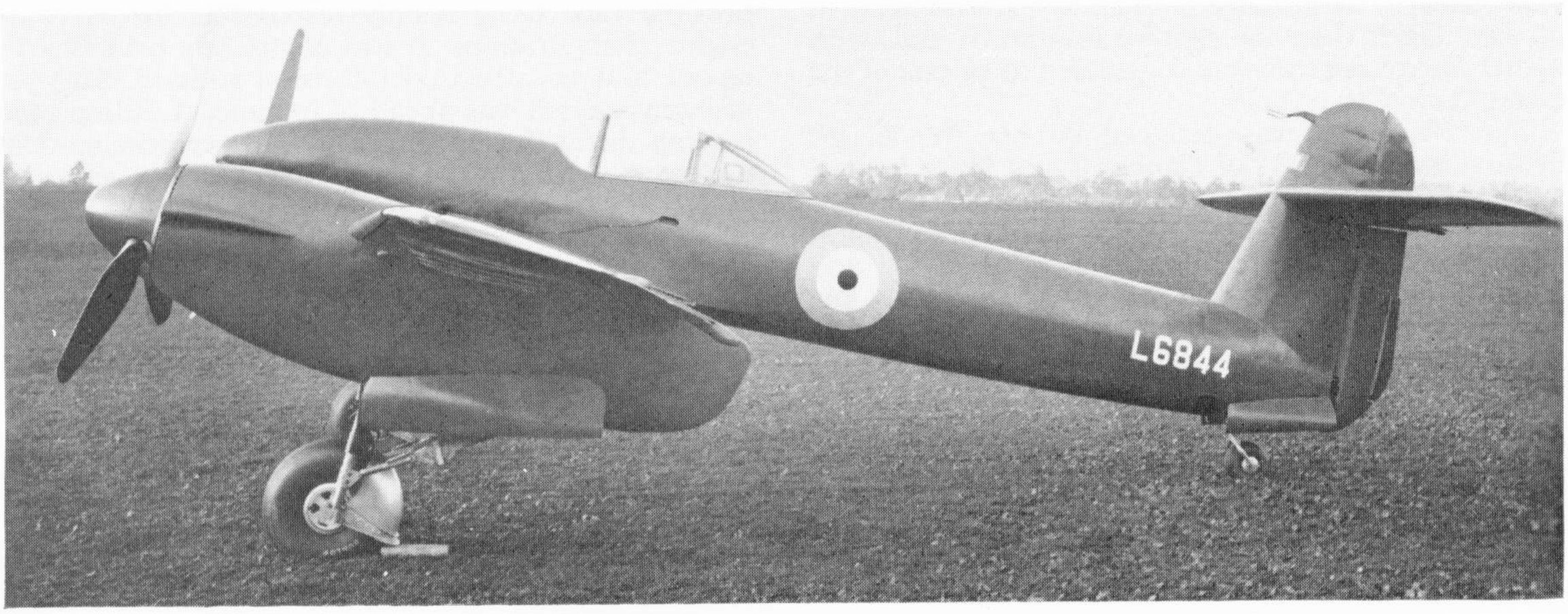
A peculiarity of the Whirlwind's control system was the fact that its two-piece rudder was concave or "hollow-ground" on both sides, the reason being that the original normally-contoured rudder was found to be very light and virtually ineffective over the first five degrees of travel either way. The adoption of a rudder with a re-entrant section overcame the problem. For reasons of control layout and nothing to do with aerodynamics, the rudder hinge was offset, and to compensate for this the rudder-section was made assymetrical port and starboard. On the upper part this was achieved by making just the starboard side hollow-ground. Another peculiarity was that part of the one-piece, high-lift Fowler trailing edge flap which stretched from aileron to aileron (it was hinged at the rear extremities of the engine nacelles which moved with it) also performed part of the function of radiator flaps, and in order to maintain a reasonably low coolant temperature, it was necessary to climb with it partly extended. If any serious delay was experienced before take-off, two fountains of steam appeared, necessitating shutting down both engines to cool off before taxiing.

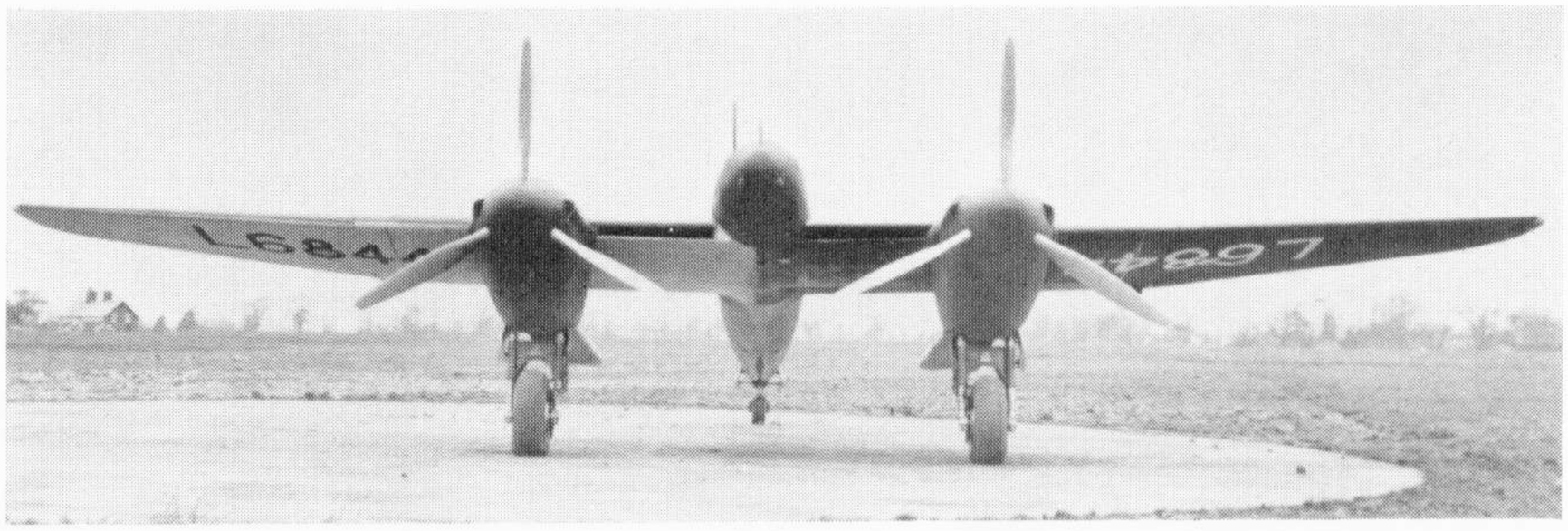
Mention has already been made of the positioning of the Whirlwind's coolant radiators in the leading edge of the wing; this not only resulted in a clean-looking and low-drag installation but, because of the radiator ducts' close proximity, it also enabled the Whirlwind's cockpit to be heated at all altitudes. Another unusual idea was the original one of running the engine exhaust pipes through the wing fuel tanks. A trial installation was made in one aircraft and during tests Harald Penrose encountered fire in the air for the third time during his career. Flames burned through the rear spar and severed the aileron controls. The ailerons were of the Frise type, and as the balance area forward of the hinge line got into the slipstream the loose aileron went hard up against the stops. To counteract this, Penrose put up the opposite aileron to the same angle and came home on rudder and engines only.

From the flying viewpoint, the Whirlwind was considered magnificent, its sole peculiarity being its tendency to develop tail shudder in really tight turns because its rudder too easily assumed rhythmic oscillations. Handley Page slats of large area were fitted to the Whirlwind's outer wings but eventually, on production aircraft, they were locked shut for structural reasons, since at least one accident was believed attributable to a slat failure. Even then, lateral behaviour at the stall was entirely adequate without their aid. The project design originally was planned to have twin fins and rudders, but in wind tunnel model tests it was found that the underslung engine nacelles caused turbulence troubles, and so the high tailplane layout was eventually adopted. There is interest in noting that consideration was given at one stage to "bending" the rear fuselage upwards, thus placing the tailplane even higher and in still calmer air.



Three views of the first prototype, L6844, *October 1938. Note girder bracing of front spar visible through intakes; also mudguards, and position of pitot head. Colour of* L6844 *was dark grey and NOT red, as is often stated.*





First prototype after application of camouflage early in W.W.2.

As related earlier the first prototype Whirlwind, *L6844*, first flew on 11th October, 1938. On the last day of that year it was delivered to the Royal Aircraft Establishment, Farnborough, and apparently it performed so well in tests that before the end of January, 1939, the Air Ministry placed a production order for 200 Whirlwinds with the first delivery promised for the following September. Shortly before the outbreak of war an additional order for 200 Whirlwinds was placed.

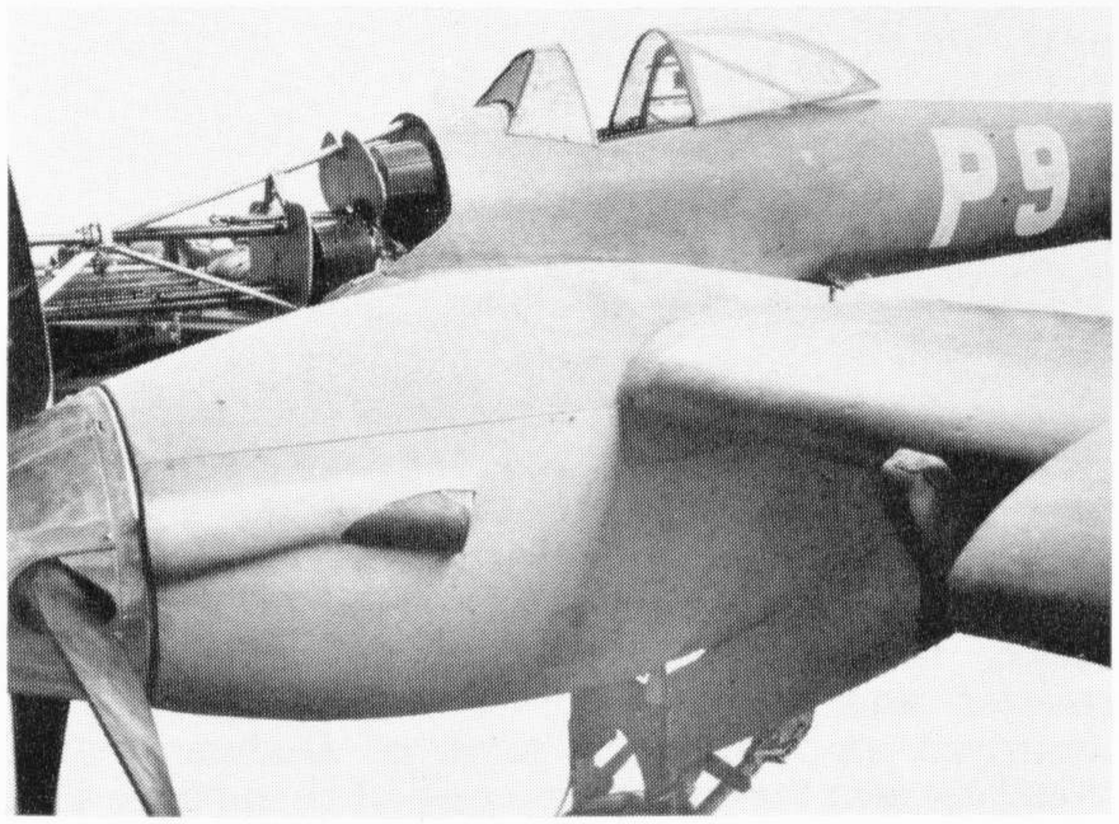
In May, 1939, the new "hush-hush" fighter was demonstrated to a party of M.P.'s at Northolt and in the words of one magazine report:

> "the 'fastest time of the day' was not put up by the Spitfire [a Mark I with the latest three-bladed variable-pitch airscrew], but by a secret twin-engined machine which streaked over from the west".

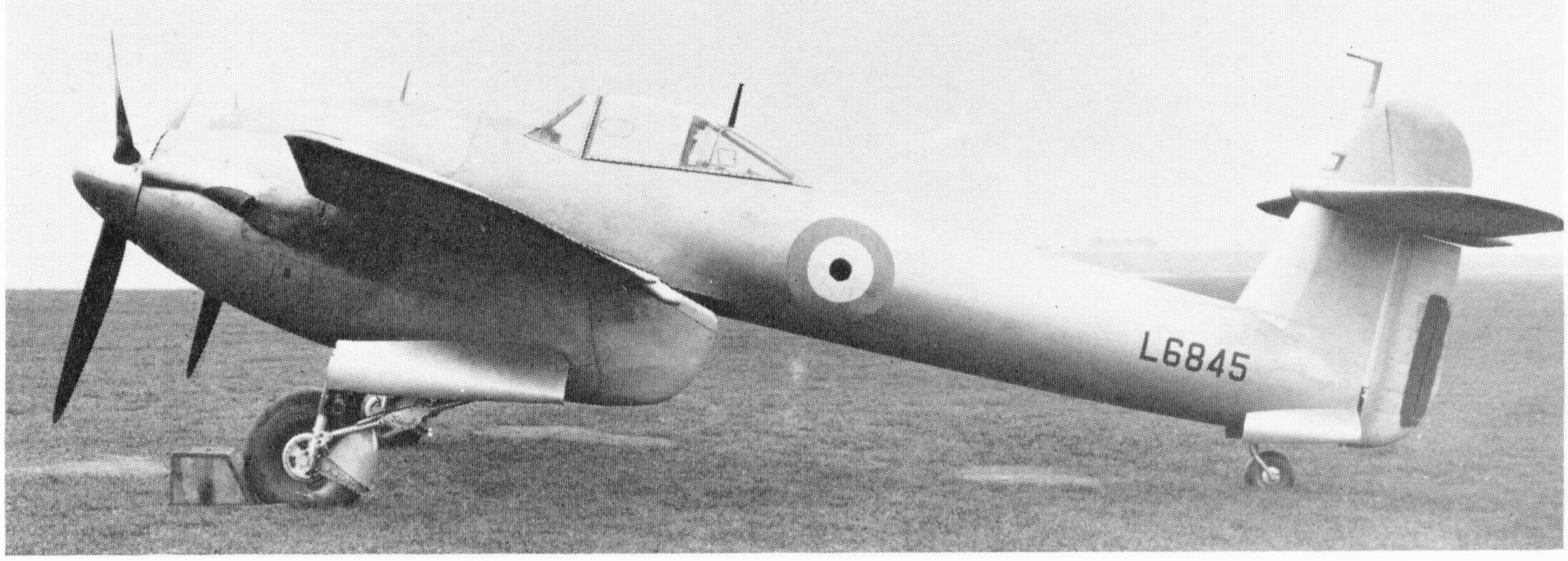
For reasons which will be dealt with later, Whirlwind production fell badly behind schedule and it was not until May, 1940, that the "first off", *P6966*, was ready to fly, the second prototype, *L6845*, being completed almost simultaneously. First deliveries—*P6966* and *P6967*—were made on 3rd June, 1940, to No. 25(F) Squadron at North Weald, this unit (which was then flying Blenheim IFs) having had a pre-view of the Whirlwind two days previously when *L6845* had been flight-demonstrated at North Weald. This proved to be a false start, however, and owing to a change in re-equipment policy, the new machines were re-allocated to No. 263(F) Squadron which had recently won immortality while flying Gladiators in Norway (see *Profile* No. 98). The squadron was scheduled to re-form at Grangemouth, Stirlingshire, in June, but owing to teething troubles suffered by the ex-25 Squadron machines, it was July before No. 263 was re-formed—at Drem—and then with Hurricanes as temporary equipment.

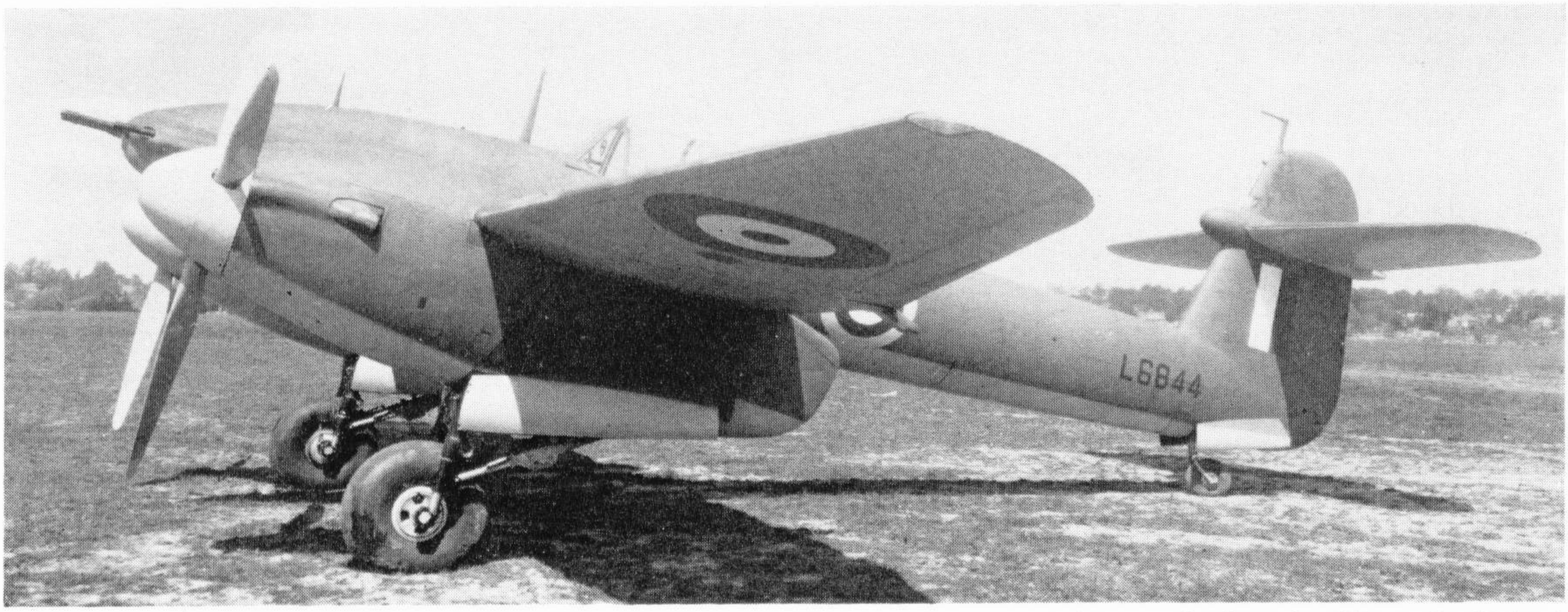
The first of No. 263's Whirlwinds arrived at Drem on 6th July, flown by the C.O., Squadron Leader H. Eeles, and two more followed on the 19th. On 7th August came the first write-off after *P6966* (Pilot Officer McDermott) had a tyre burst on take-off. The Whirlwind was a touchy aircraft on take-off at the best of times, and in this particular instance the pilot was lucky; for despite the fact that his aircraft swerved, the nose did not touch the ground and he was able to get it airborne. While trying to retract the wheels McDermott learned from flying control that the undercarriage was visibly damaged and was warned that a landing would be hazardous. He climbed and baled out. The Whirlwind went thirty feet deep into the ground north of Stirling and McDermott made a safe landing only to be made prisoner by the local Home Guard!

Deliveries of Whirlwinds to No. 263 Squadron were held up by a lack of engines and only eight Whirlwinds were in service by October, 1940. The squadron moved to Exeter at the beginning of December and became operational on Whirlwinds on

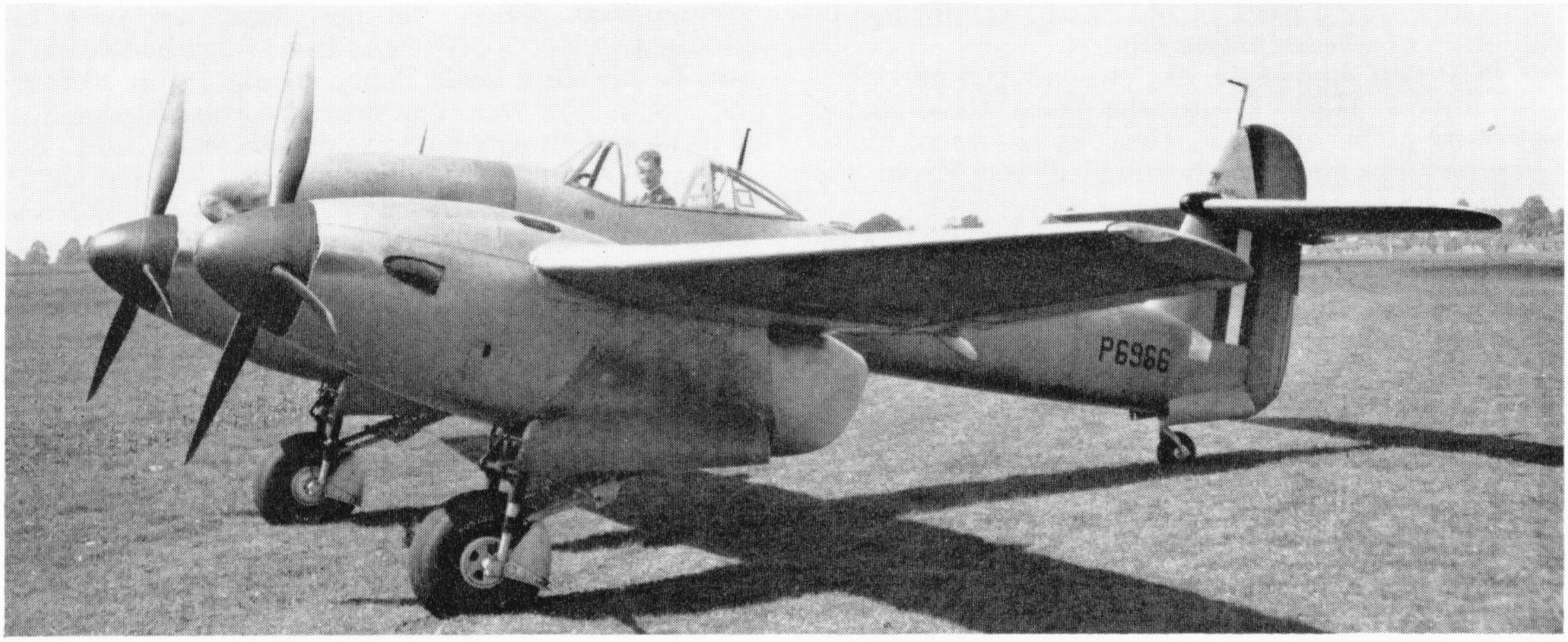


Two views of second prototype, both taken in August 1939. In lower view, aircraft is in silver finish. Compare tail unit, cockpit, canopy, exhaust and pitot head with those of first prototype.



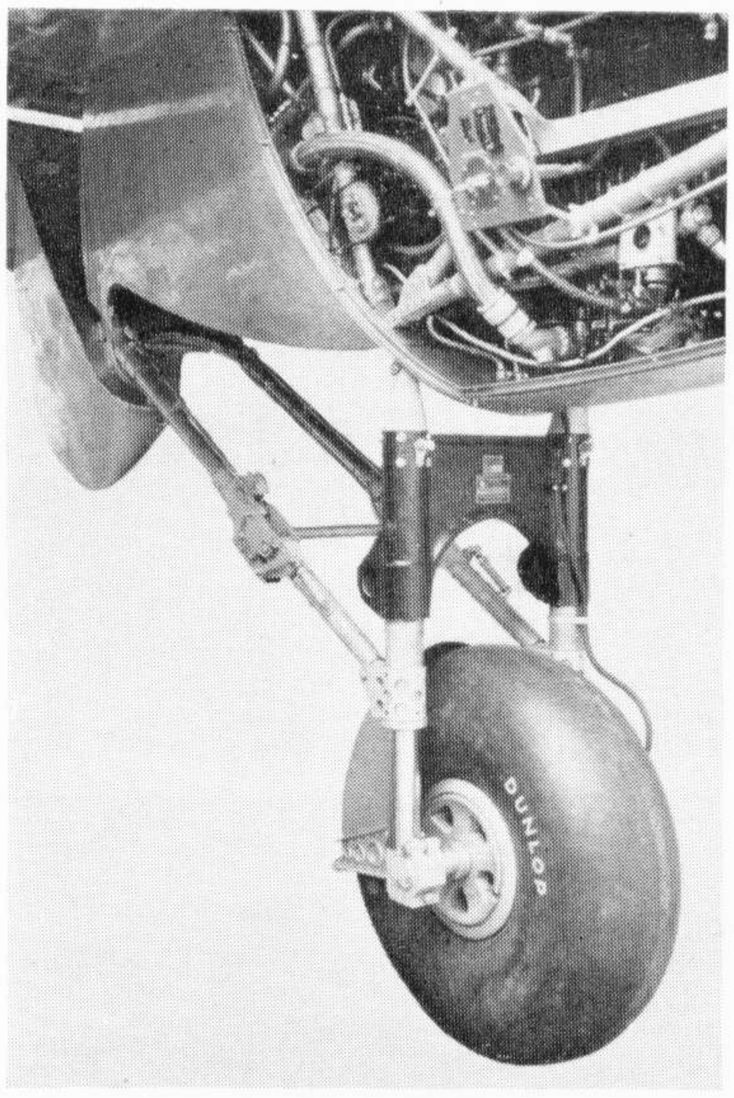


(Above) *First prototype with experimental four-abreast cannon installation. Note extended nose and enlarged tail "acorn".* (Below) P6966, *the first production Whirlwind in primer finish, summer 1940.*

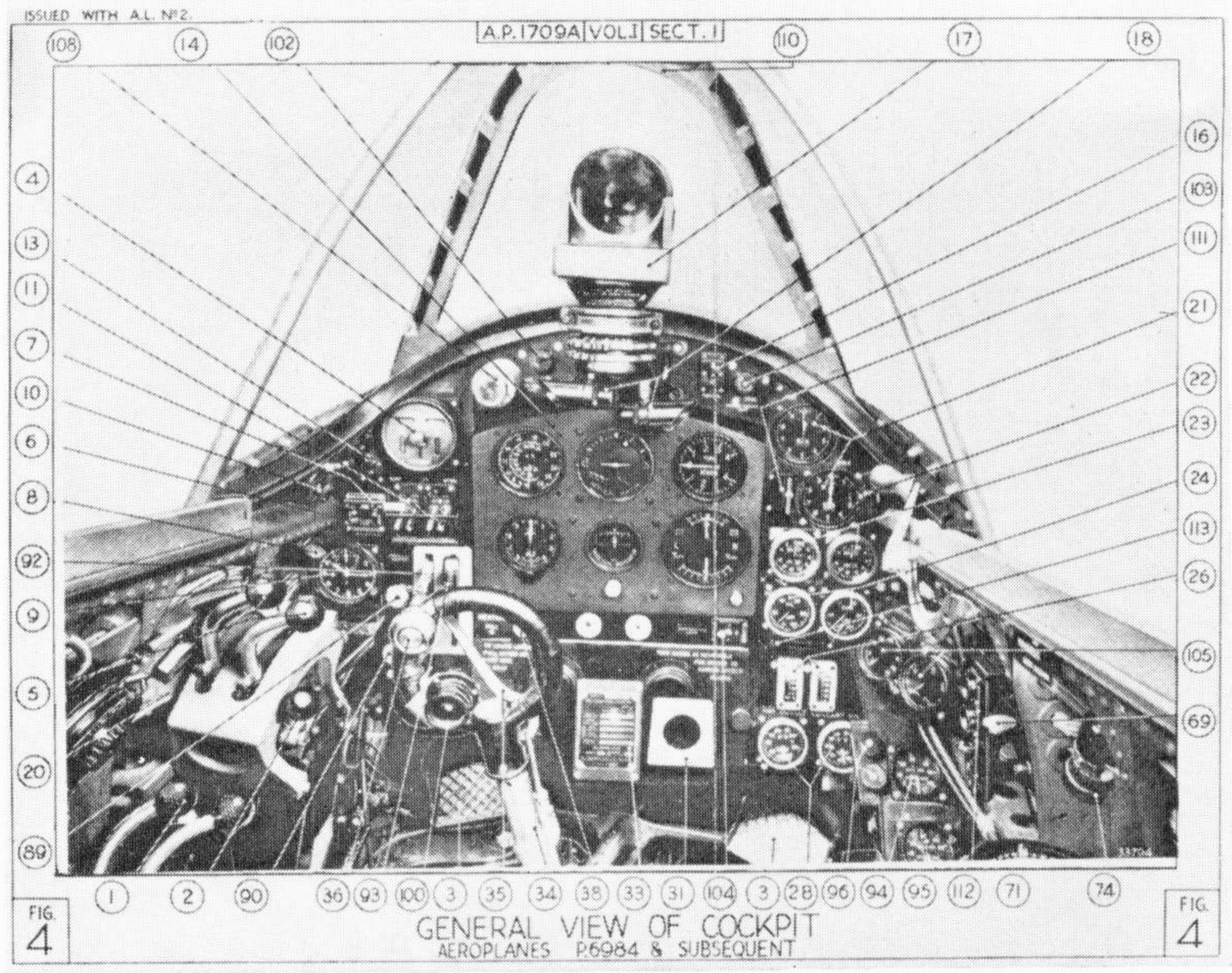


7th December, flying 30 sorties before the month ended. So deplorable was the condition of the airfield surface at Exeter, however, that early in the New Year an operational flight was detached to St. Eval. The squadron's first action came on 12th January, 1941, when Pilot Officer Stein and Sergeant Mason, on standby duty, were detailed to intercept a returning German bomber. Stein intercepted the "bandit" some forty miles south-west of the Scillies and following his attack, No. 263 was credited with 'one Ju 88 damaged'. In February the squadron gained its first confirmed victory with Whirlwind aircraft when Flying Officer Hughes and Pilot Officer Graham (who was missing after the encounter and assumed to have been shot down) destroyed an Arado 196 south of Dodman Point. Westland sent the squadron a case of champagne with which to celebrate the victory.

A production Whirlwind (P7056) *in dark earth/green/Sky finish.*



(Above) *Undercarriage detail on first prototype Whirlwind.* (Right) *Cockpit,* P6984 *and subsequent machines.*



Following an attack by the *Luftwaffe* on St. Eval in the middle of March when nine of No. 263's twelve Whirlwinds were damaged on the ground, the entire squadron moved to Portreath, but on 10th April it moved again, this time to Filton (Bristol). During the first four months of 1941 the squadron lost many pilots through flying accidents, and three in action.

Convoy patrols were undertaken by the Whirlwinds during May and on 14th June six aircraft took part in the first *Warhead* operation—code-name for low-level strikes against airfields in the Cherbourg Peninsula, the purpose of which was to destroy enemy aircraft on the ground. The Whirlwinds operated from Ibsley on this particular occasion, but owing to ground mist at the selected targets—Maupertuis and Querqueville—the main strike was centred on tarpaulin-covered equipment. This operation marked the start of the Whirlwind's career as a ground-strafing aircraft. On 7th August No. 263 moved to Charmy Down and five days later it provided close escort, as far as Antwerp, for 54 Blenheims of No. 2 Group making a daylight raid on power stations near Cologne. During the same month, the squadron flew many offensive sorties—mainly against airfields at Querqueville, Maupertuis and Lannion—as a result of which three Ju 88's, at least eight Ju 87's and some Bf 109's were destroyed on the ground, one E-boat sunk and another damaged. On one occasion four Whirlwinds were intercepted by twenty Bf 109's while engaged on a *Warhead* sortie and a fierce dog fight ensued. Although outnumbered 5 to 1, the Whirlwinds gave a good account of themselves and destroyed two of the enemy. Two Whirlwinds were damaged and a third force-landed when returning to base. All this led the squadron diarist to record:

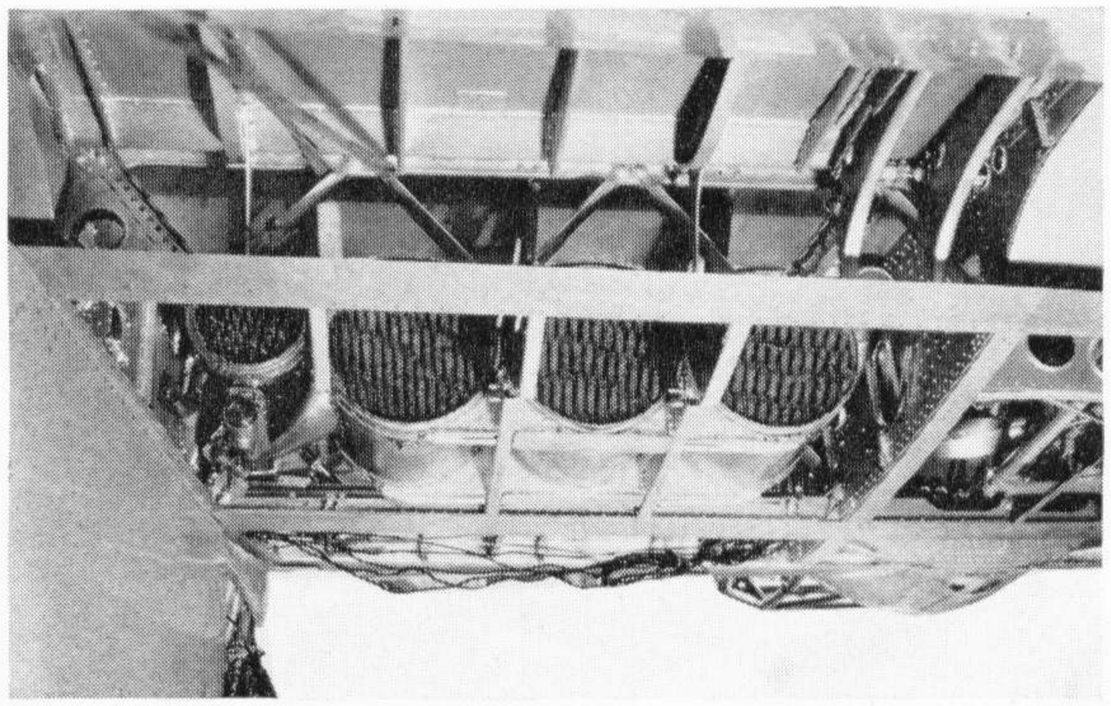
> "The Whirlwind has at long last been completely justified and vindicated, having shown that it is an admirable machine for ground strafing and also that it is a match for the Me.109s".

While this may have been true low down, it was not so at altitudes, where, through changing tactics, the majority of combats were taking place. What the Whirlwind urgently needed was an improved mark of Peregrine, but Rolls-Royce were heavily committed to Merlin production and development at this time, and were disinclined to spare the effort to improve the Peregrine's performance. At some stage the Air Ministry and the Ministry of Aircraft Production apparently discussed the idea of re-engining the Whirlwind but rejected the idea of giving it a new lease of life in this way because they considered "its fuselage was too small and its entire layout unpromising"*. Thus it was that the Whirlwind's lack of altitude performance reduced its effectiveness as a weapon of war and, in turn, restricted its operational career. Another contributory cause, again mentioned in an official volume† is that

> "at a time i.e. 1938, when nearly all types were being ordered 'off the drawing board', the Air Staff required the Whirlwind prototype to complete brief handling trials before the production order was given to the firm. Its development period was thereby considerably retarded with the result that when it did come into service it had missed its operational opportunity (as a heavy-armed interceptor) and was never able to catch up the time it had lost".

* *British War Production* (H.M.S.O.)
† *Design and Development of Weapons in World War II* (H.M.S.O., 1964)

Radiator installation in wing of first prototype.



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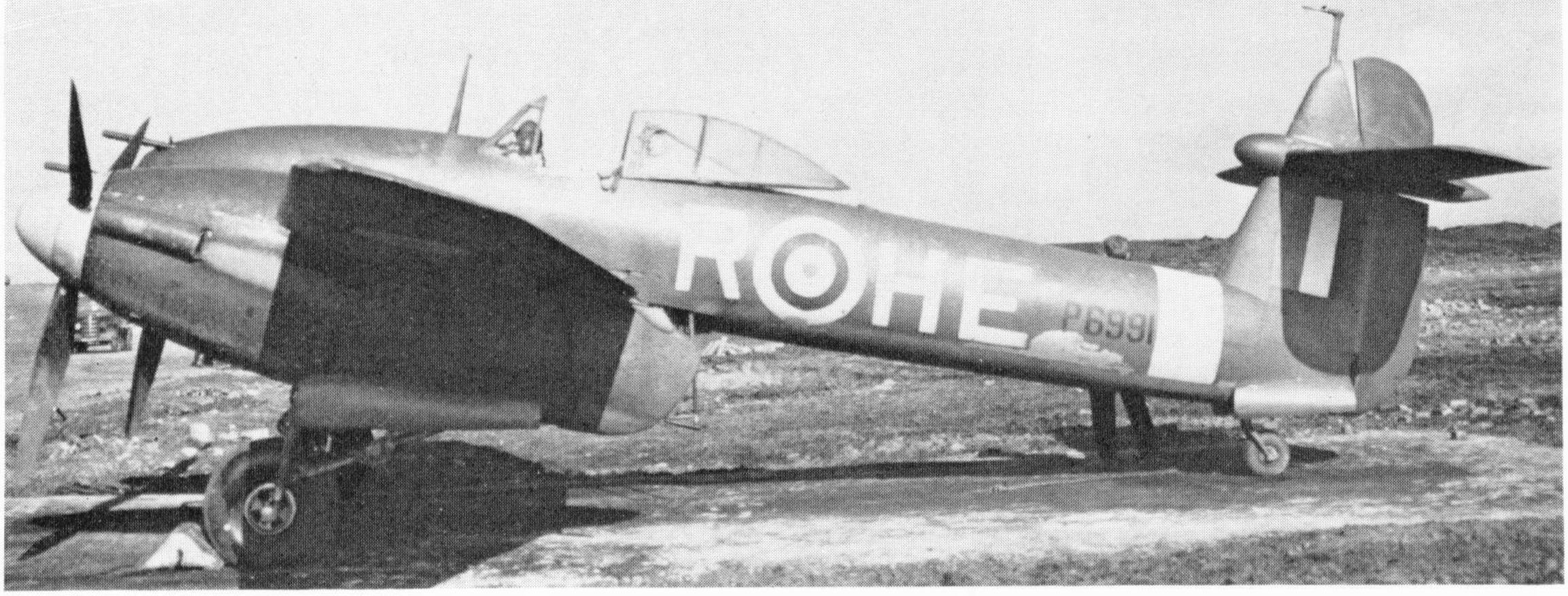
P7115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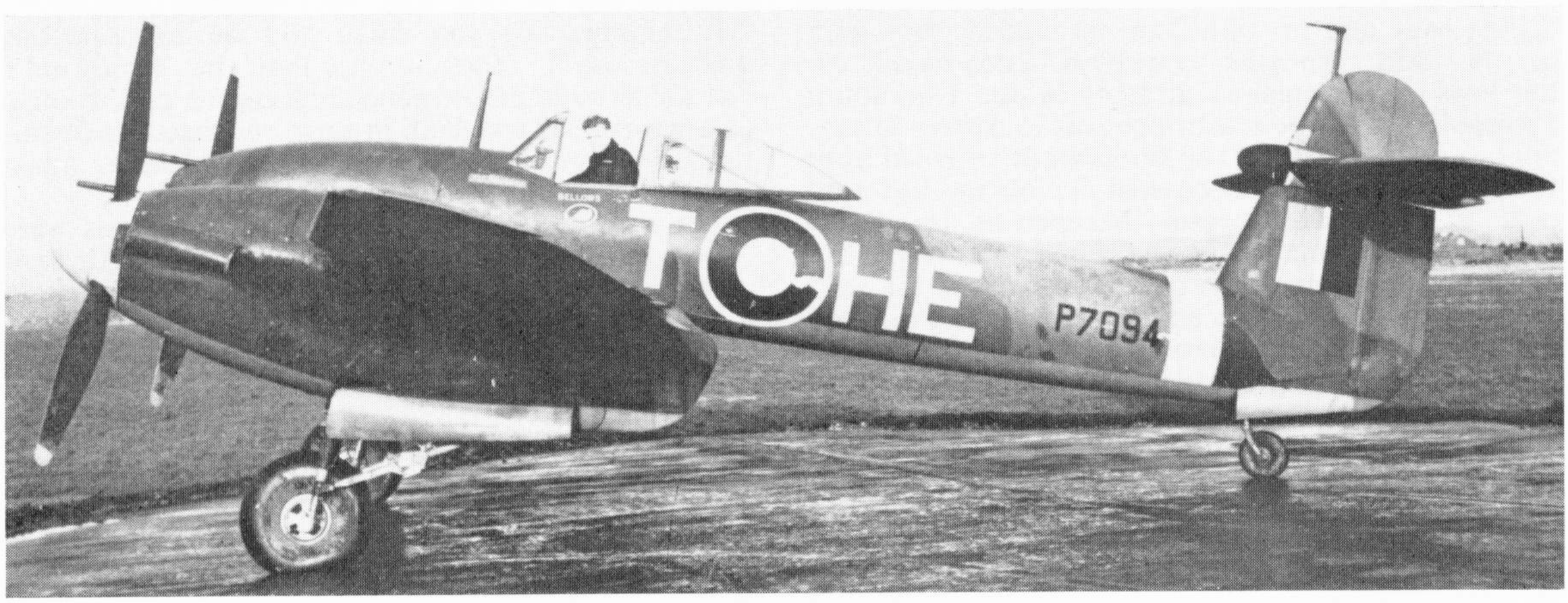
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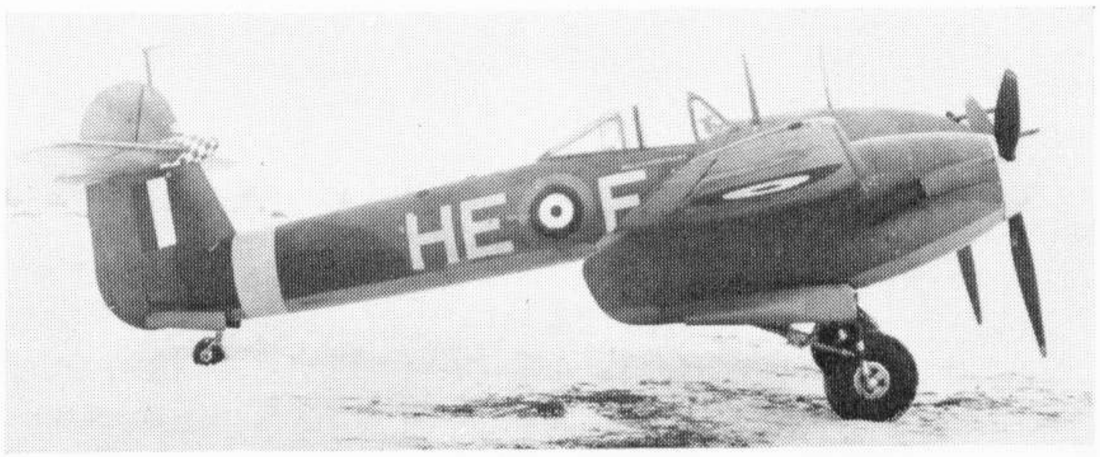


Another view of P7116, *personal mount of No. 263 Squadron's C.O.* (Photo: I.W.M.)

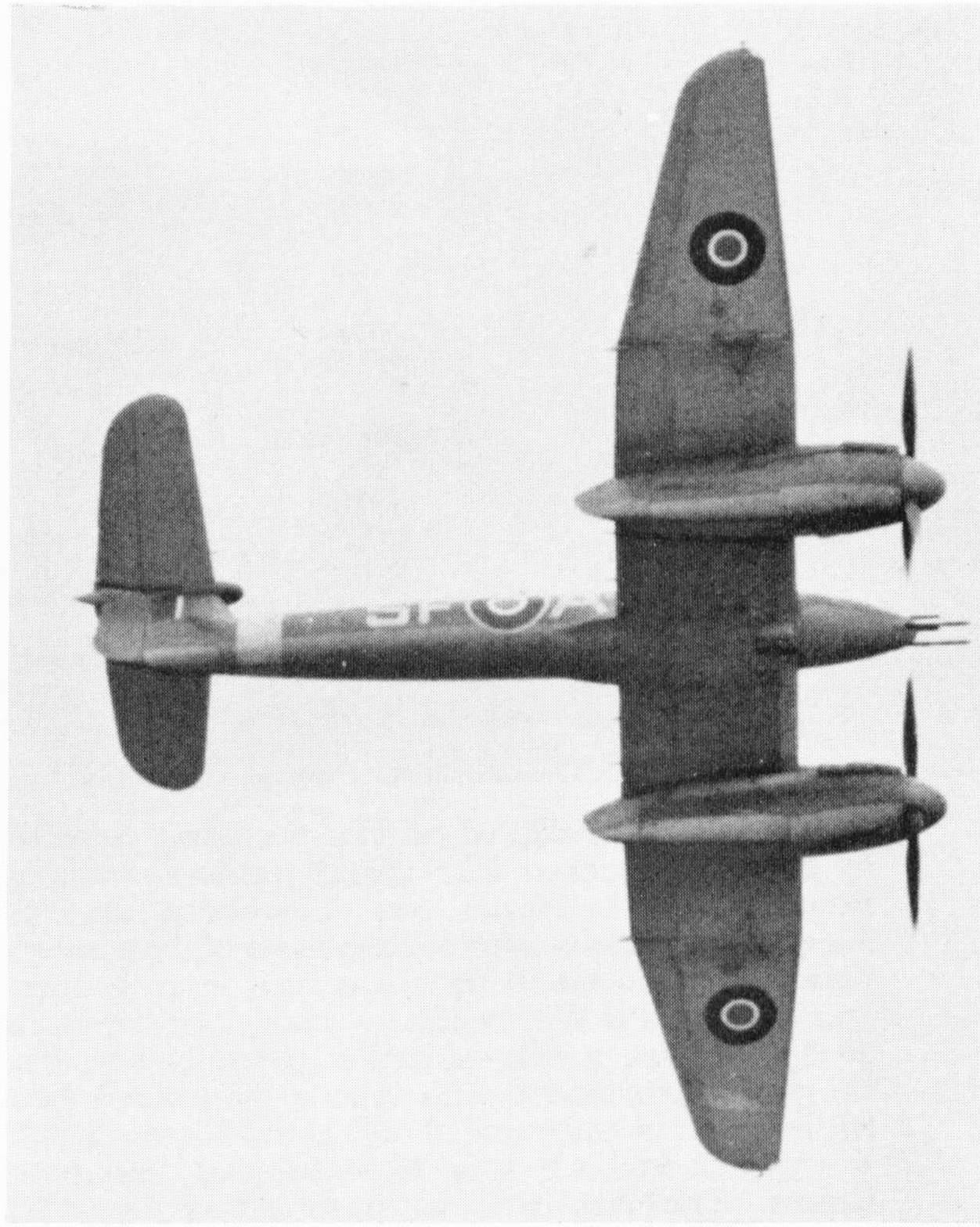
PRODUCTION CUT-BACK

The second production order for 200 Whirlwinds which had been placed in mid-1939 was cancelled in 1940 and the initial order for a similar quantity was reduced to 114 aircraft. The last of these left the assembly line in January 1942.

At the end of 1941, No. 263 Squadron was at Colerne, having been based successively at Martlesham Heath, Wattisham and Predannack. Meanwhile another Whirlwind squadron had formed on 20th September, 1941—No. 137 at Colerne, moving soon afterwards to Charmy Down, and No. 263 had assisted its formation by contributing pilots and other personnel. On 12th February, 1942, No. 137 Squadron, by now based at Matlask (and having previously operated from Charmy Down, Predannack and Coltishall, in turn) took part in the famous "Channel dash" episode and in doing so lost four aircraft in a dog fight with twenty Bf 109's.

The ensuing months saw the Whirlwind squadrons engaged in convoy patrols and *Rhubarbs* (massive fighter sweeps over Northern France and the Low Countries), in which targets ranged from railway locomotives to oil refineries, and—over sea—from E-boats to minesweepers and even a lighthouse. Another activity was night-flying training. During this period the squadrons each saw several changes of location.

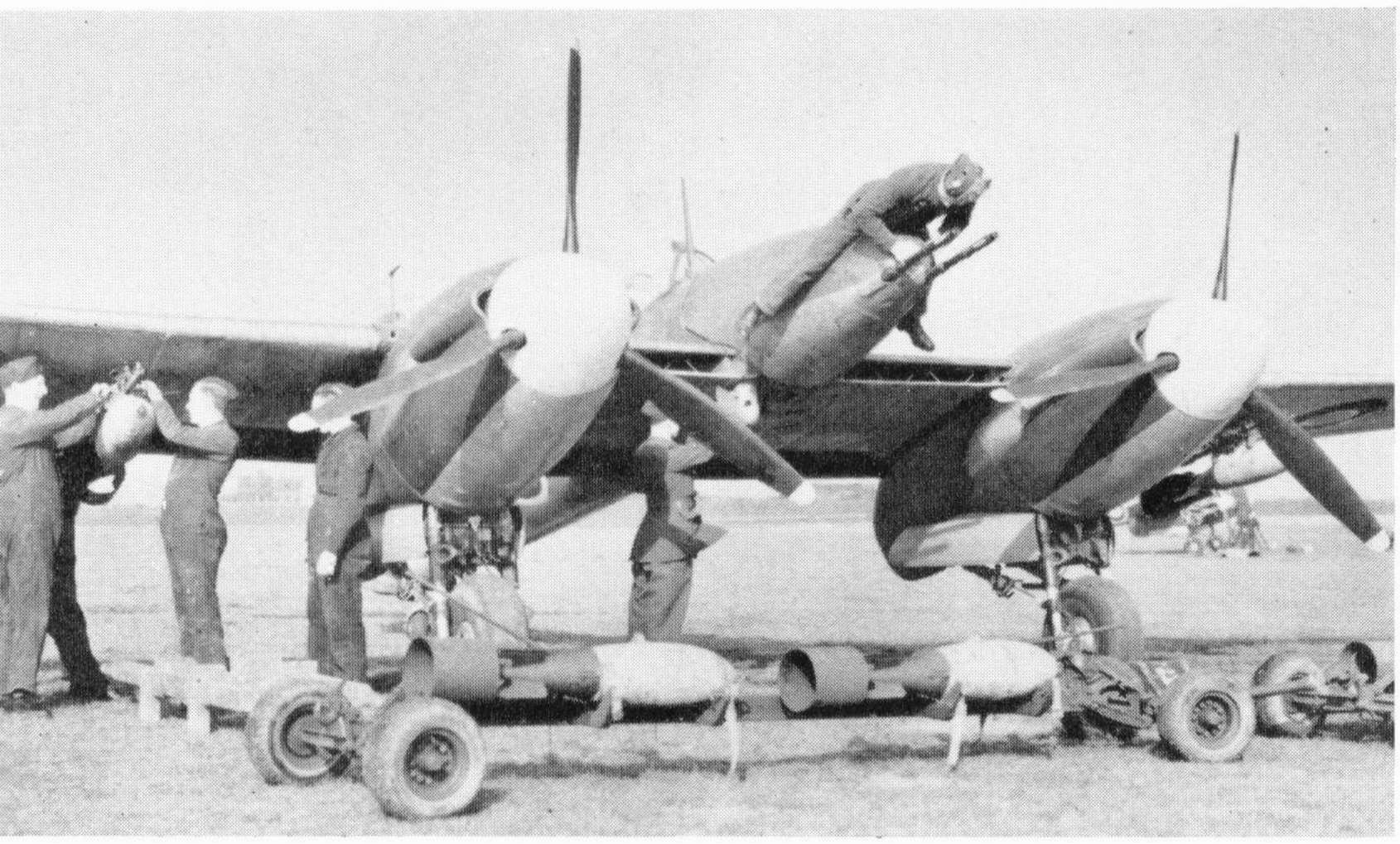
In the latter part of 1942 the Whirlwind was adapted as a bomber and subsequently joined the Hurribomber in attacking the enemy in occupied territory with cannon and bombs by both day and night. One 250 or 500 lb. bomb was carried beneath each wing, and thus modified the Whirlwinds were unofficially known as "Whirlibombers". The fitting of bomb racks to the Whirlwind was advocated in September, 1941, by Squadron Leader T. Pugh, D.F.C., the C.O. of No. 263 Squadron, but it was not until 21st July, 1942, that the first of the squadron's Whirlwinds was modified to carry bombs. The first "Whirlibomber" operation—by No. 263 Squadron and only intended as a trial run—took place on



One of No. 137 Squadron's aircraft in flight, serial unknown. (Photo: "Aeroplane").

Whirlwind P6997 *of No. 137 Squadron.* (Photo: Charles E. Brown)

(Facing page). *263 Squadron quartet. Compare paint schemes. For details of* P7094 *and* P7116 *see page 10.* (Top and last two photos: copyright Imperial War Museum)



One of No. 137 Squadron's "Whirli-bombers" being re-armed.
(Photo: "Aeroplane")

9th September, 1942, when two sections, escorted by Spitfires, attacked four armed trawlers steaming from Cap de la Hague, near Cherbourg, towards Alderney. Success was immediate—two of the trawlers were sunk. No bomb sight was used in such operations, and as the Whirlwinds invariably bombed from 50 feet or less, a delayed action generally fuse was chosen. When loaded with bombs the aircraft flew left wing low in a dive and at high speed aileron snatch was experienced. It was recommended that both bombs be dropped simultaneously during low-level attacks, but if pilots wished to make two bombing runs then they were advised to drop the port bomb first.

The two Whirlwind squadrons continued to terrorise the enemy with bombs and cannon until the Typhoon took over the job in 1943. No. 263's hunting grounds were the Brest and Cherbourg Peninsulas and the Western Approaches, while No. 137, operating from Manston, covered the Channel and Northern France. Railway lines showed up well in the moonlight, smoke proclaiming the approach of a train. When "working on the railway", the Whirlwind's four 20 mm. Hispano cannon proved entirely satisfactory—indeed one No. 137 Squadron pilot blew up four locos in a single sortie. In its first six months of fighter-bomber operations No. 137 Squadron destroyed or damaged thirty-seven goods trains, sixteen of them by night and the rest by day. By day only goods trains were attacked, but by night passenger trains were also considered fair game, for only Germans were permitted to travel by night in occupied territory. Enemy airfields also were a favourite target for low-level beat-ups by the "Whirli-bomber" boys.

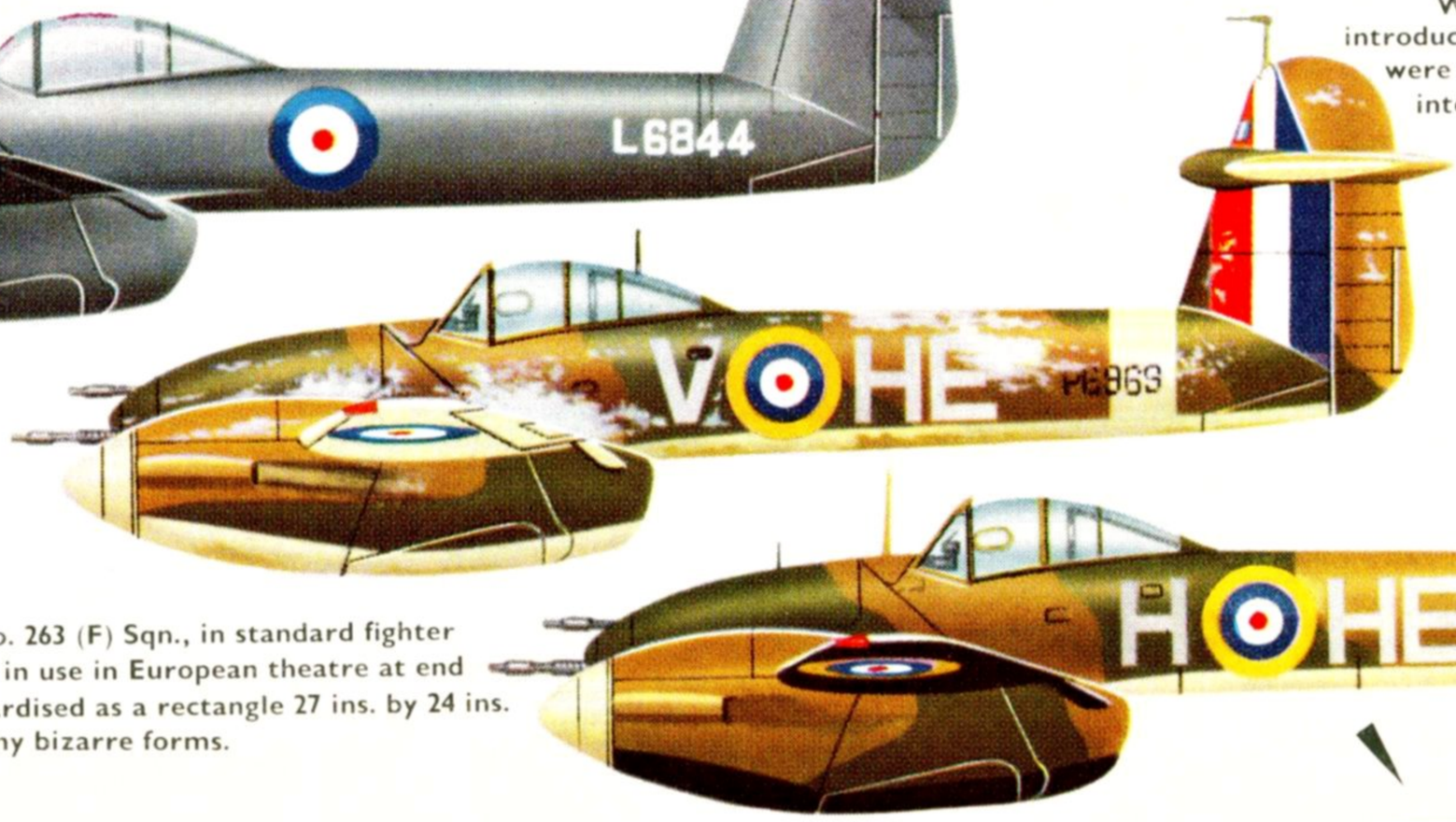
Eleven Whirlwinds were subscribed for by war weapons funds, notably that organised by the wealthy British colony in South America and known as the Bellows Fellowship, whose object was to "raise the wind" for the purchase of aircraft for Britain. Each member had to contribute a centavo for every German aircraft shot down by the Fellowship's "own" aircraft, and membership grew to 70,000. The Fellowship's Whirlwind gifts included *P7094*, which carried the word "Bellows" by the cockpit with a pair of bellows painted beneath it within an oval surround; *P7055*, *P7116-P7121* inclusive, "Bellows Argentina Nos. 1-7" respectively and *P7122* "Bellows Uruguay No. 1". Another presentation aircraft, *P7056*, subscribed for by the people of its West Country birthplace, was named "Pride of Yeovil".

Some interesting experimental armament installations were made on the Whirlwind. The first prototype, *L6844*, was fitted with twelve 0·303 in. Browning machine guns, while another Whirlwind mounted a single 37 mm. cannon.

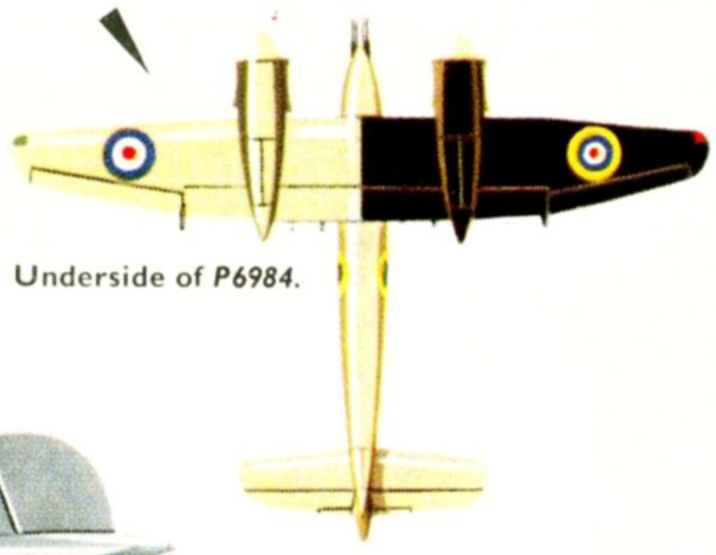
Another splendid action study of P7048 *which later became G-AGOI* (see page 12). (Photo: Charles E. Brown)

The first prototype Whirlwind I, *L6844*. The colour of the aircraft has been subject of controversy but new information from Westland Aircraft Ltd. indicates that it was as illustrated here.

Whirlwind I *P6969* of No. 263 (F) Sqn.; probably earliest example of operational Whirlwind markings. Typical Battle of Britain colour scheme with "sky" spinners and band added subsequently. When fin stripes were introduced in May 1940 squadrons were permitted to use their own interpretation of the directive.

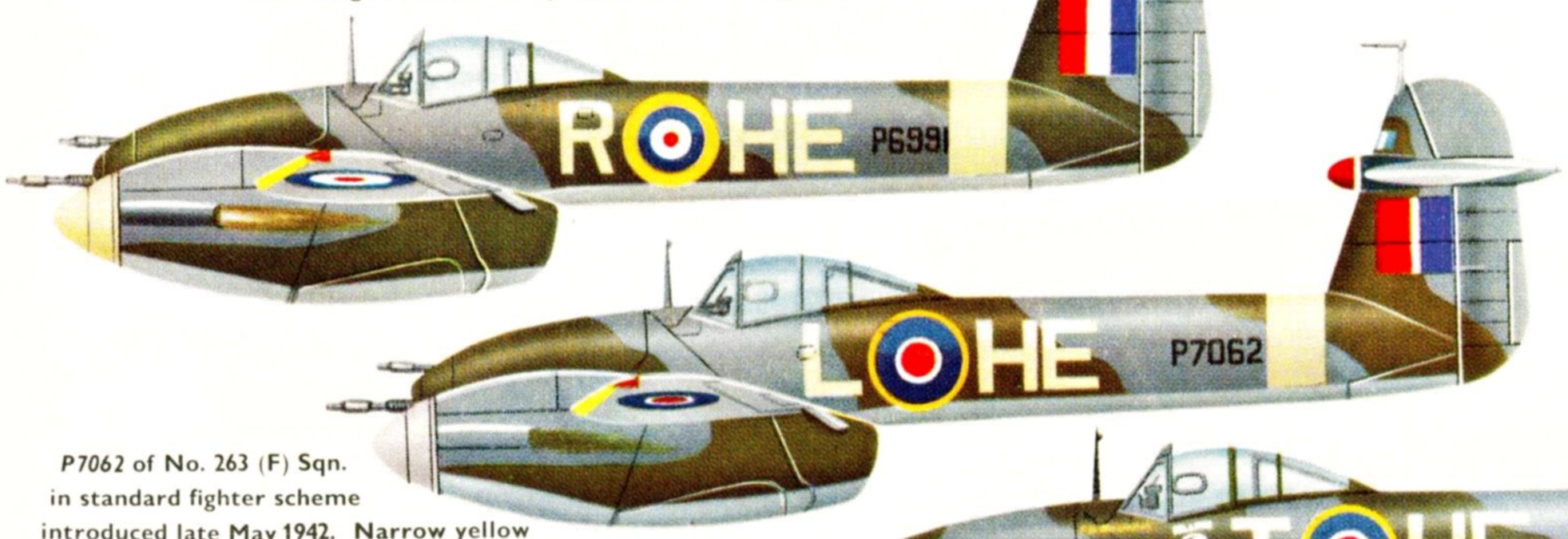


Whirlwind I, *P6984* of No. 263 (F) Sqn., in standard fighter markings and camouflage in use in European theatre at end of 1940. Fin stripes standardised as a rectangle 27 ins. by 24 ins. after appearing in many bizarre forms.



Underside of *P6984*.

Whirlwind I, *P6991* of No. 263 (F) Sqn., in standard fighter markings and camouflage in use in European theatre in early May 1942.



P7062 of No. 263 (F) Sqn. in standard fighter scheme introduced late May 1942. Narrow yellow and white sections made markings less conspicuous; fin stripes were standardised as a 24 in. square. Red "bullet" on tailplane is an individual touch.

P7094 of No. 263 (F) Sqn., early 1943; as markings indicate, this aircraft was presented to the R.A.F. by the Bellows Foundation in South America, and flown by Flight Lieutenant Bricksham. Port nacelle camouflage reversed.

P7102 of No. 137 (F) Sqn. Presented by Mr. & Mrs. Ellis of Fiji, the aircraft was named "Comrades in Arms".

First prototype Whirlwind used for testing various armament installations, illustrated with four Hispano 20 mm. Mk. II guns mounted laterally.

The civil Whirlwind, G-AGOI, flown during 1945/46; a conversion of *P7048*.

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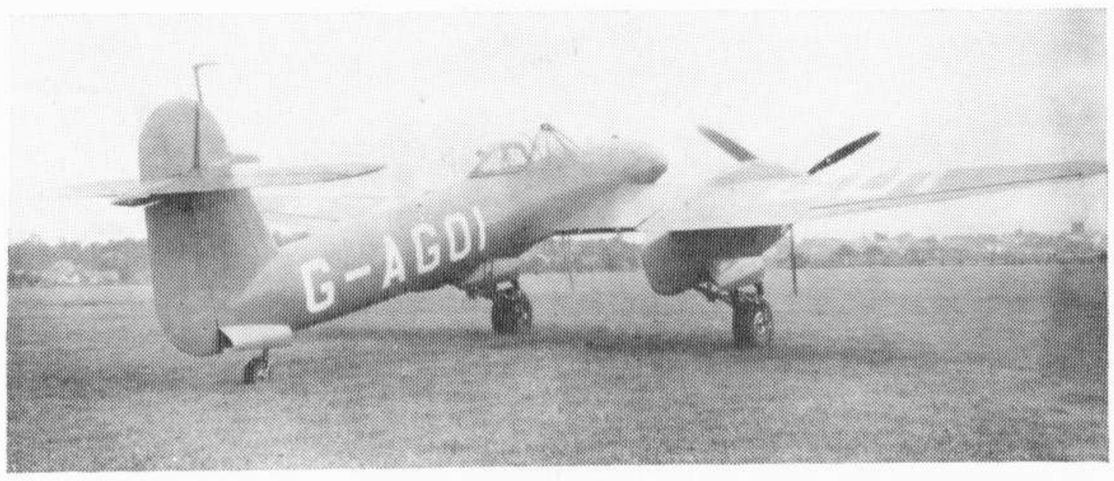
Only Whirlwind to escape scrapping during the war was P7048 (above and below). *It was badly damaged in May 1943 but after being repaired at Yeovil it was briefly used post-war as a Westland Company "hack", registered G-AGOI (effective 23rd October 1946). In 1947 it was dismantled.*



A high altitude photo-reconnaissance version of the Whirlwind was projected but did not materialise.

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PRODUCTION

2 Prototypes to Air Ministry Specification F.37/35; *L6844* and *L6845*, 140 Production aircraft to Contract 980384/39 placed early in 1939 and originally calling for 200 aircraft: *P6966-7015*, *P7035-7064*, *P7089-7122*.

The following aircraft from above-mentioned contract were cancelled in 1940: *P7123*, *P7158-7177*, *P7192-7221*, *P7240-7269*. Also cancelled were 200 aircraft specified in Contract 20186/39 placed mid-1939: *R4243-4283*, *R4296-4325*, *R4345-R4384*, *R4400-4445*, *RR4460-4479*, *R4499-4521*.

EXAMPLES OF WHIRLWINDS IN SQUADRON SERVICE

P6983 "HE-H" of No. 263 Sqdn.
P6989 "HE-J" of No. 263 Sqdn.
P7094 "Bellows" Originally with No. 137 Sqdn. and later "HE-T" of No. 263 Sqdn.
P7102 "Comrades in Arms" (presented to R.A.F. by Mr. & Mrs. Ellis of Fiji) "SF-P" of No. 137 Sqdn. Later to No. 263 Sqdn.

SPECIFICATION

Wings: Low wing cantilever monoplane. All-metal structure with light alloy stressed-skin covering. Metal-framed fabric-covered ailerons. Fowler-type trailing-edge flaps on centre-section between ailerons and fuselage. Rear part of engine nacelles hinged to move with the flaps to which they were attached. Handley Page anti-stall slats fitted to leading edge of outer wing panels.

Fuselage: Oval section metal monocoque structure with stressed-skin covering.

Tail Unit: All-metal structure with stressed-skin covered fixed surfaces and fabric-covered movable surfaces. Cantilever tailplane mounted high up fin with acorn-type fairing at intersection of two surfaces. Divided rudder and elevators.

Undercarriage: Backwards-retracting type, main wheels being completely enclosed by hinged doors when raised into engine nacelles. Fully-retractable tailwheel.

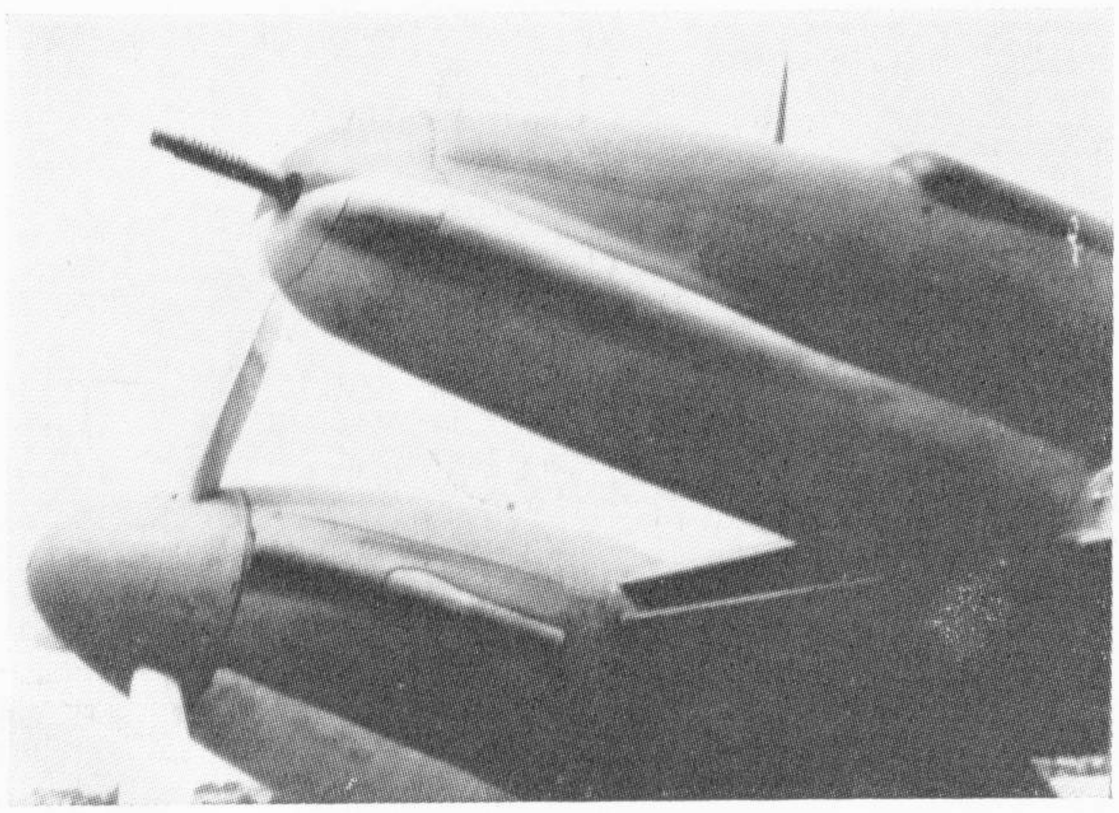
Powerplant: Two Rolls-Royce Peregrine I 12 cylinder vee liquid-cooled geared and supercharged engines, each developing 885 h.p. at 3,000 r.p.m. at 16,250 ft.; 860 h.p. at 2,850 r.p.m. at 13,500 ft., and 765 h.p. at 3,000 r.p.m. at sea-level with 87 octane fuel. Three-blade de Havilland D.H.4/4 variable pitch, constant speed airscrews of 10 ft. 0 in. diameter.

Armament: Four fixed 20 mm. Hispano Mk. I cannon (Oerlikon design and Hispano licence) in nose, each with a magazine containing 60 rounds of ammunition and giving a rate of fire of 600 lb./minute. Provision made in service for two Mk. III Universal bomb-carriers, one under each wing, for 2×250 or 2×500 lb. bombs.

Dimensions: Span 45 ft. 0 in. Length (overall) 32 ft. 3 in., (tail down) 32 ft. 9 in. Height (tail down) 10 ft. 6 in. Track 12 ft. 9 in. Wing area 250 sq. ft.

Weights: Empty 8,310 lb. Loaded as fighter 10,356 lb. Loaded as bomber, 10,888 lb. with 2×250 lb. bombs, 11,388 lb. with 2×500 lb. bombs.

Performance: Max. speed (light): 315 m.p.h. at 5,000 ft., 335 m.p.h. at 10,000 ft., 360 m.p.h. at 15,000 ft., 350 m.p.h. at 20,000 ft. Max. speed (loaded): 304 m.p.h. at 15,000 ft. with full war load and racks, 278 m.p.h. at 15,000 ft. with full war load and 2×250 lb. bombs, 270 m.p.h. at 15,000 ft. with full war load and 2×500 lb. bombs.



(Left) *Experimental installation of 37 mm. cannon. Note extended nose and bulged magazine covers.*

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